Overview of Enabling Research Activities

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Strategy for Enabling Research

- Two Applications
  - LWST
  - DWT
- Investments guided by TIOs
  - Direct impact on COE is through the subcontracts that deliver systems, components, or concepts
  - Support for TIOs is through Enabling Research Tasks
- Two Roles
  - Supporting industry subcontracts
  - Generating new technology

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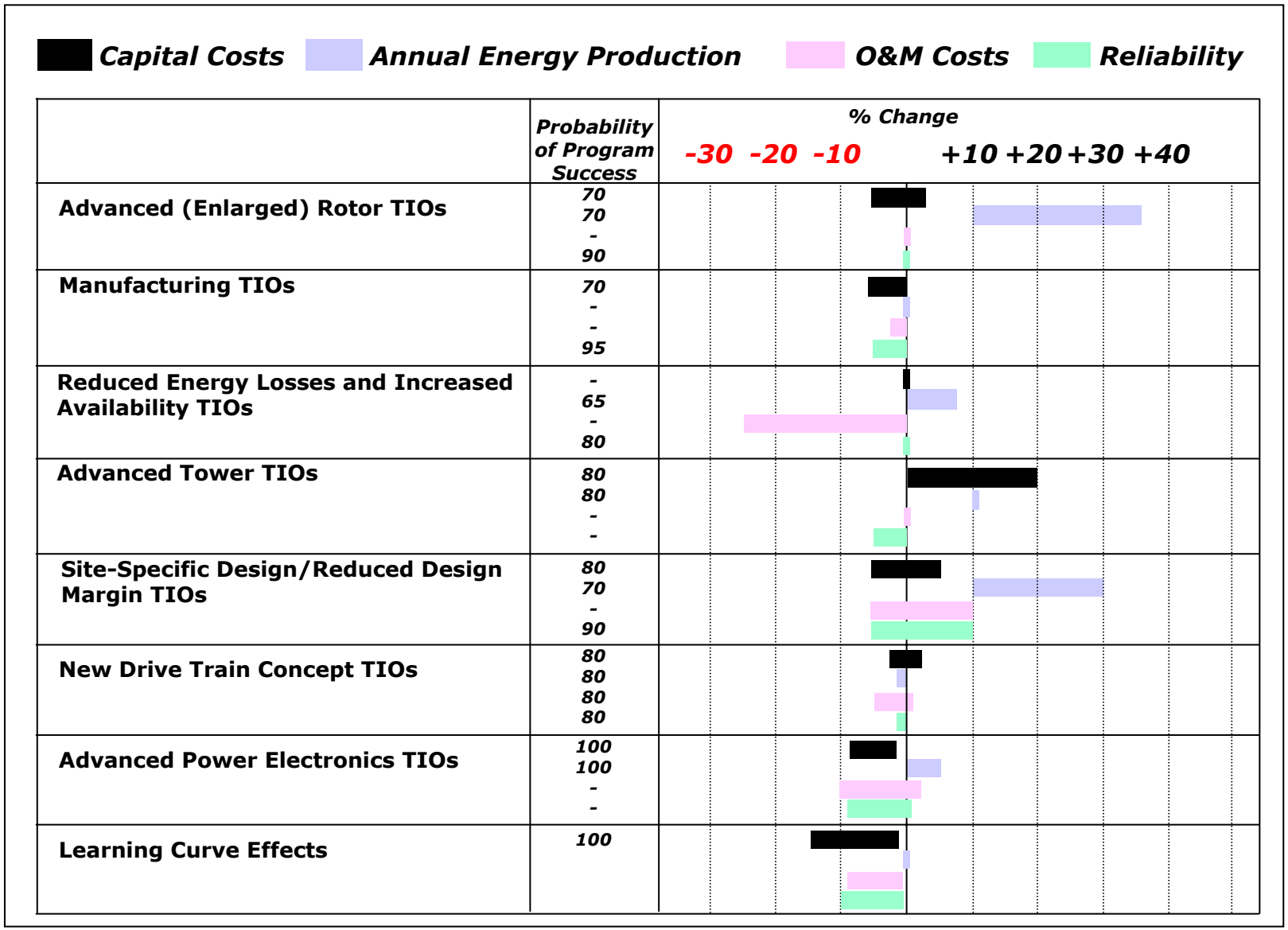
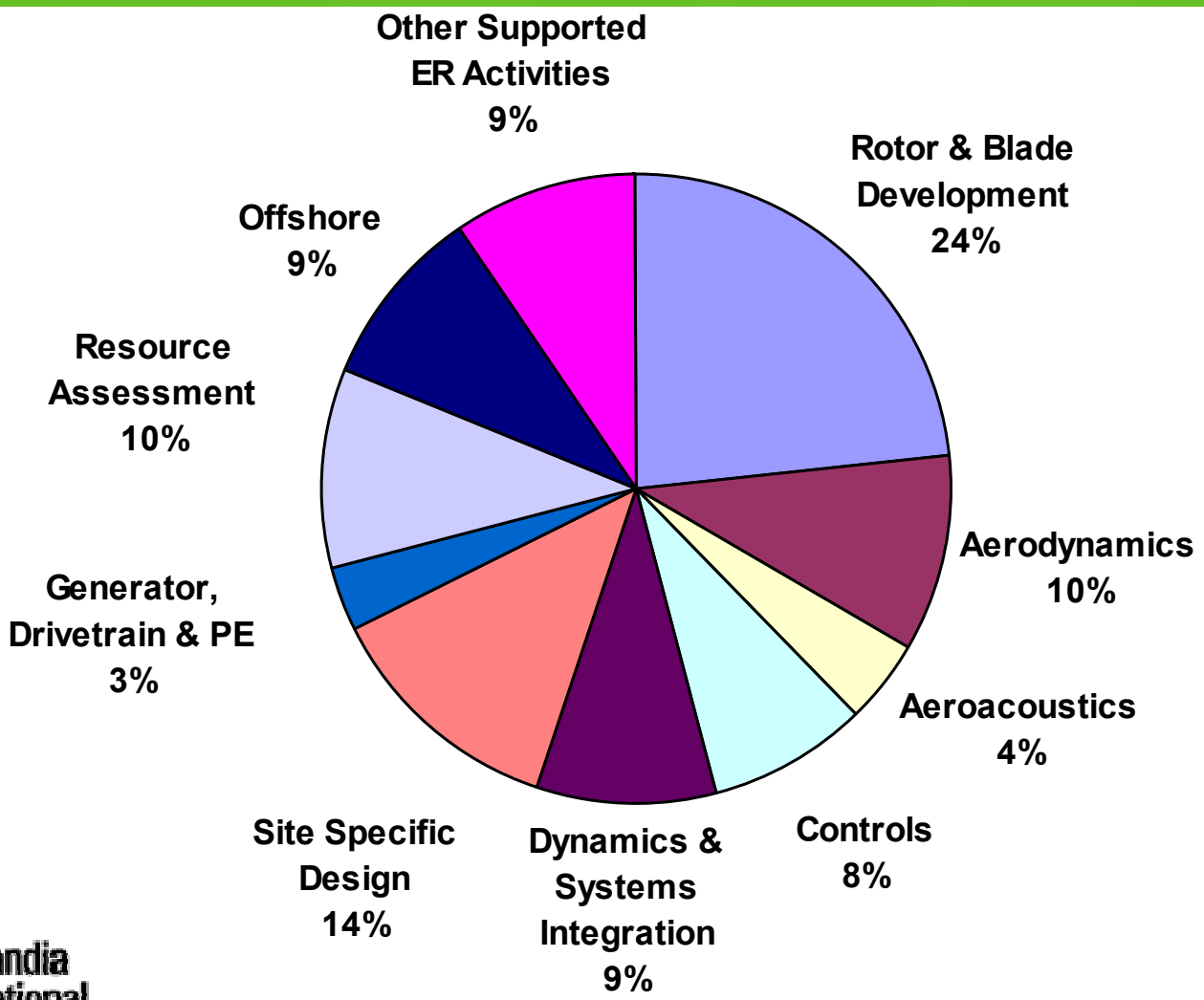
TIOs' Potential for Improvement
(% change from reference turbine)



Enabling Research $ 10.2 M



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TIO Cross-walk with Enabling Research

Technology Improvement Opportunities (TIOs)		Impact:
		High = H
		Moderate = M
		Low
		Pgm Investment :

		LWST Subcontracts	Clipper Windpower - Quantum Turbine	GE Wind - Multi-Megawatt Turbine	Northern Power Systems - Generator drive train development - Direct Drive	Global Energy Concepts - single Stage Drive/Medium Speed Generator	Northern Power Systems - Advanced Power Electronics	Peregrine Power - Silicon Carbide PE	NATech - Thermal Plate Forming	New Generation Motors - Axial Flux Generator	BEW - Medium Voltage Drive	GEC Aero/ Control	GE Wind - Desalionation	GEC - O&M	AWS - Atmospheric Meas/Model - Offshore	MIT - Floating Platform Dynamics	Concept Marine - Floating Platform/Anchor	GEC - Blade Study
Advanced (Enlarged) Rotor	Advanced materials		M	H														H
	Changed/improved structural/aero design		H	H								M						M
	Active controls		M	M								M						
	Passive controls			M								M						M
	Higher tip speed ratios/lower acoustics			M														
Manufacturing	Manufacturing methods			H					H									H
	Lower margins													M				M
	Manufacturing markups													H				H
Reduced Energy Losses & Increased Availability	Health monitoring (SCADA, etc)			M														
	Blade soiling mitigation																	
	Extended scheduled maintenance			M										H				
Advanced Tower TIOs	New Materials																	
	Innovative structures								H							H	H	
	Advanced foundations															H	H	
	Self-erecting designs								H									
Site-Specific Design / Design Margin Reduction	Improved definition of site characteristics														H			
	Design load tailoring														H			
	Micrositing														H			
	Favorable wind speed distributions and shear														H	H	H	
Drive Train Concepts	Permanent magnet generator		H		H	H				H								
	Innovative mechanical drives		H		H					H								
Advanced Power Electronics TIOs	Incorporation of improved PE components		M	H	H		H	H			H							
	Advanced circuit topology		H			M	H	H			H							
Learning Curve Effects				M		M												M

Microsoft Excel Worksheet

Selected Presentations

- High Impact efforts
- Major activity levels in FY05
- Cooperative interaction with industry

- LIST Testing in Lamar (Zayas)
- LIST Turbulence Model Development (Kelley)
- Advanced Blade Development (Ashwill)
- Advanced Controls Research (Fingersh)

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